Road Salts in the Suburban Landscape: Transport, Direct Effects, and Interactions with Other Pollutants

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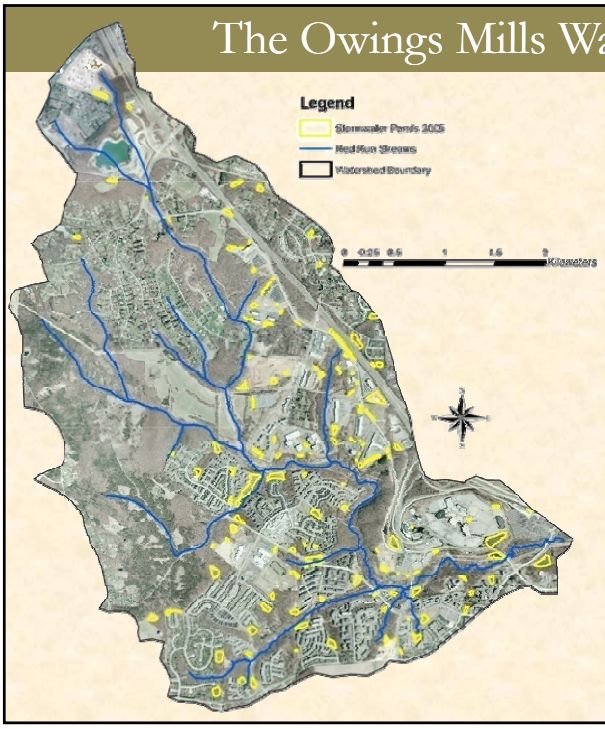
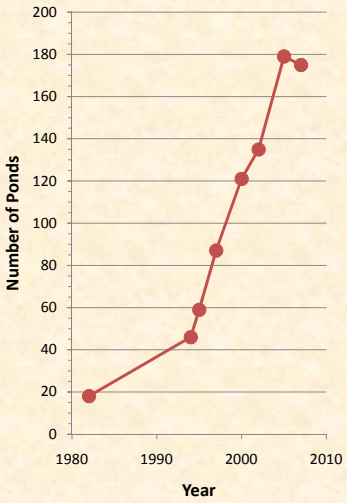
TOWSON UNIVERSITY

NIWR
The National Institute for Water Resources

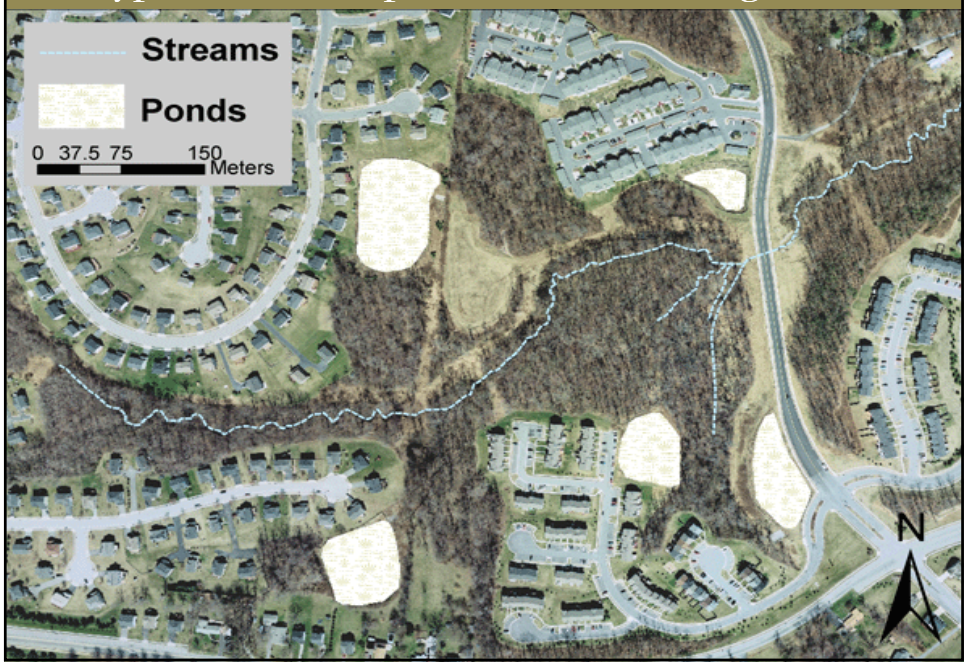
General Outline

The Owings Mills Watershed





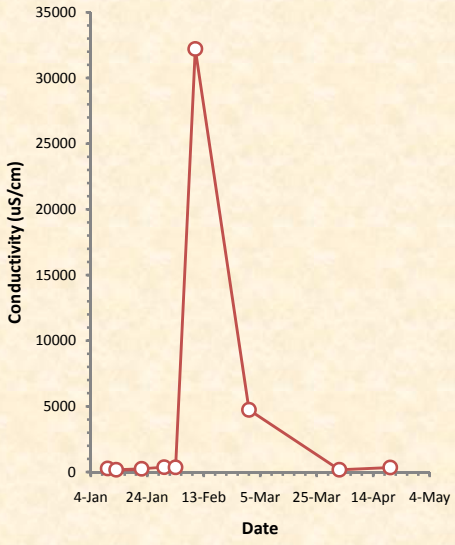
Typical Landscape Pattern in Owings Mills

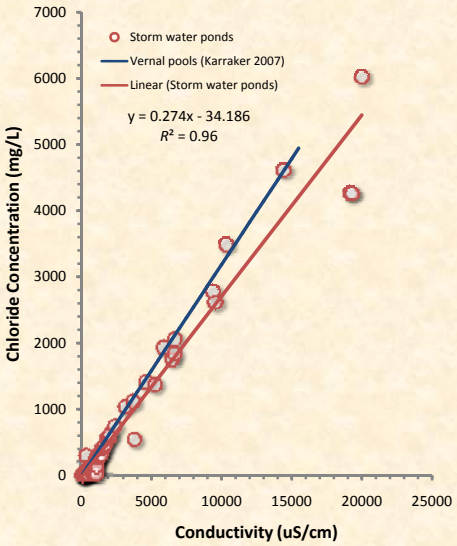


Measurement of ions and metals

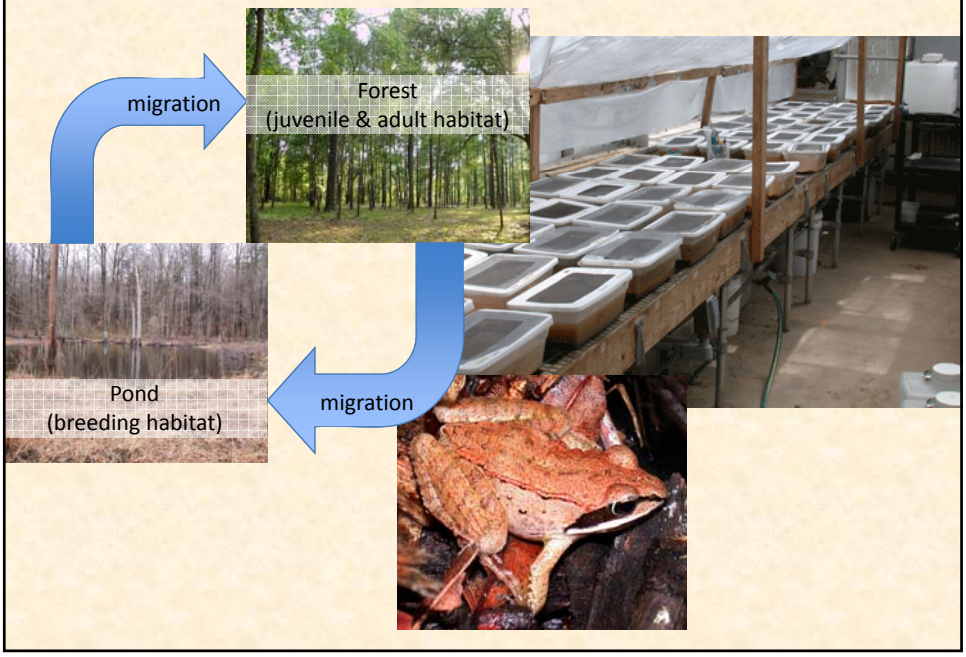
- All analyses conducted at the Urban Biogeochemistry laboratory at TU
- Metal analyzed using Inductively coupled mass spectrometry (ICPMS)
- Ion analyzed on ion chromatograph (IC)
- All runs include blanks, duplicates, and standards

Inputs to storm water ponds





Biological effects in ponds



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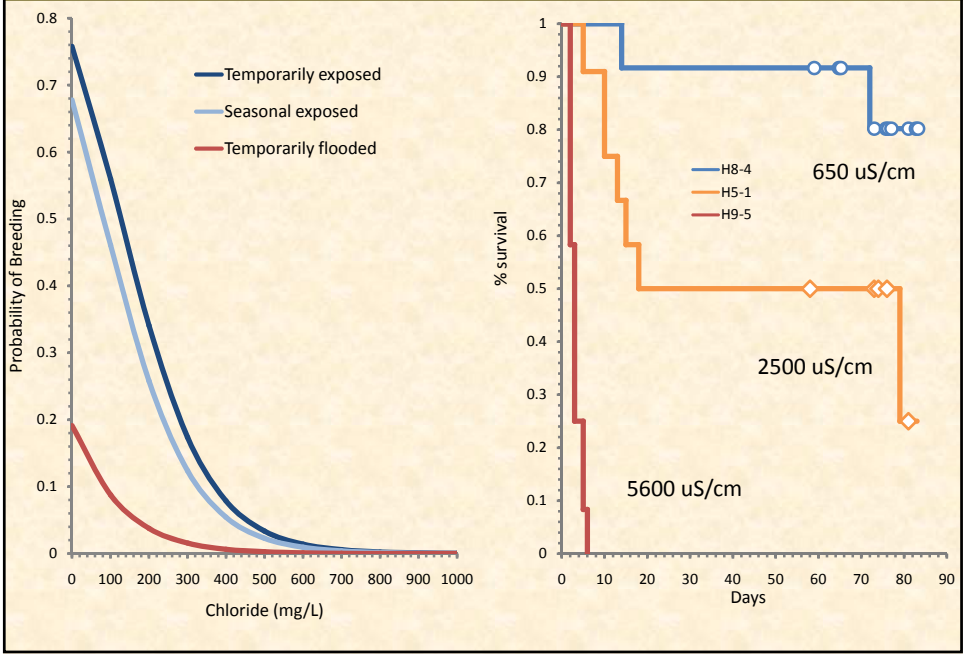
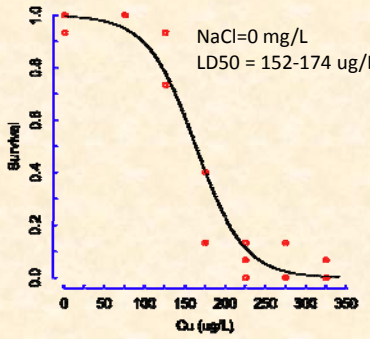
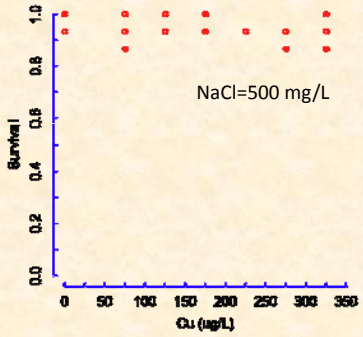


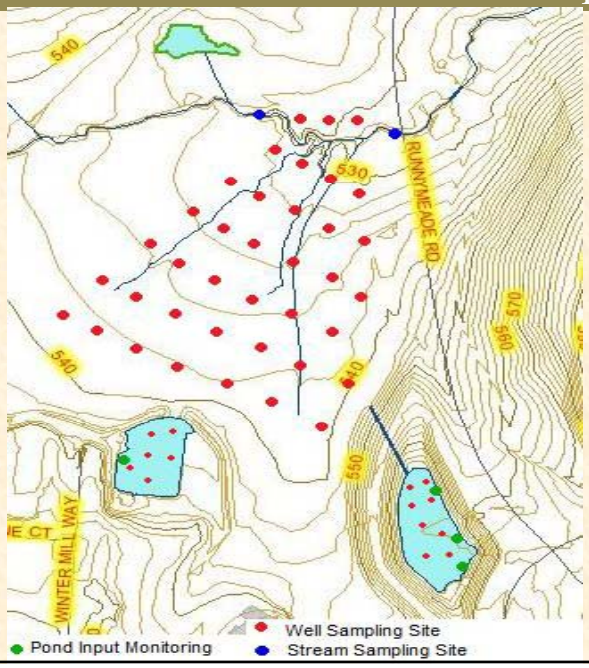
Bioassay of the interaction between salt and copper:

- Two-way, completely factorial design
- Green Frog embryos (*Lithobates clamitans*)
- Cu at six levels (0, 75, 125, 175, 225, 275, and 325 ug/L)
- NaCl at six levels

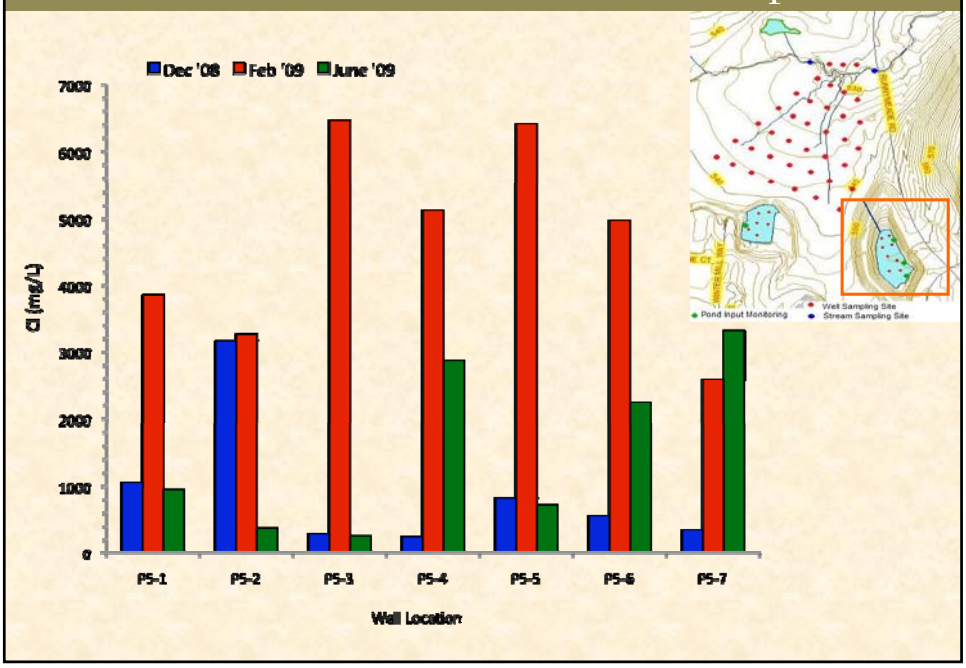




Movement into soils of storm water ponds



Movement into soils of storm water ponds



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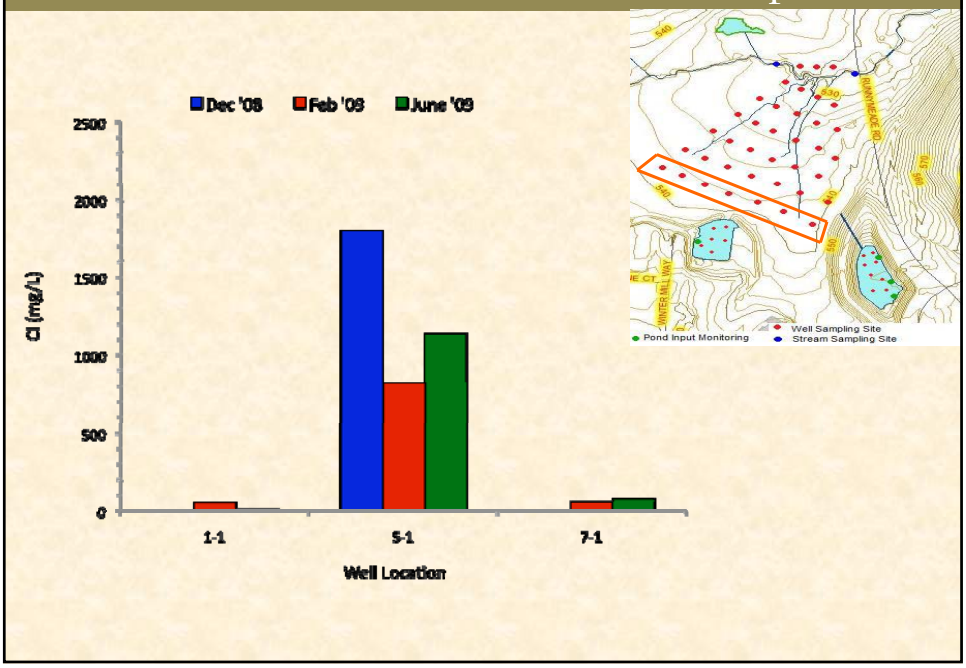

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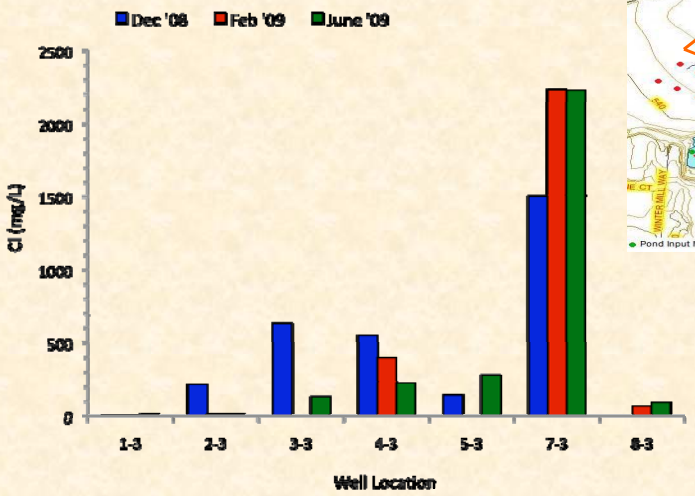
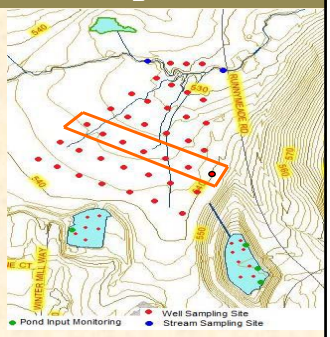
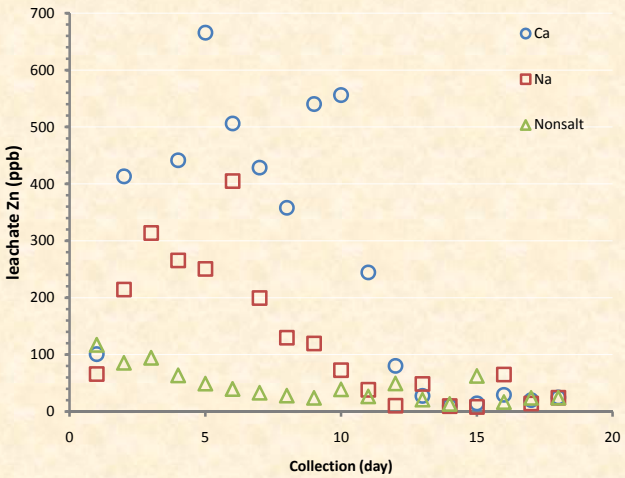
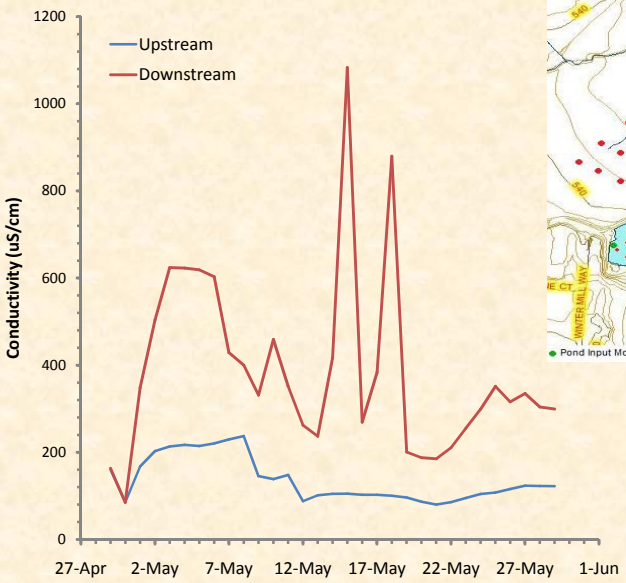


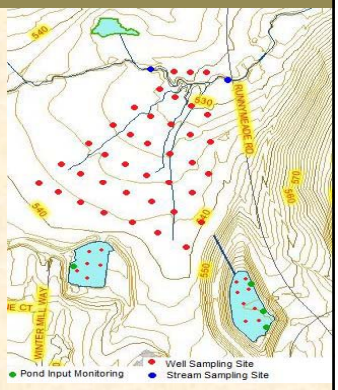


Changes in soils ion binding capacity



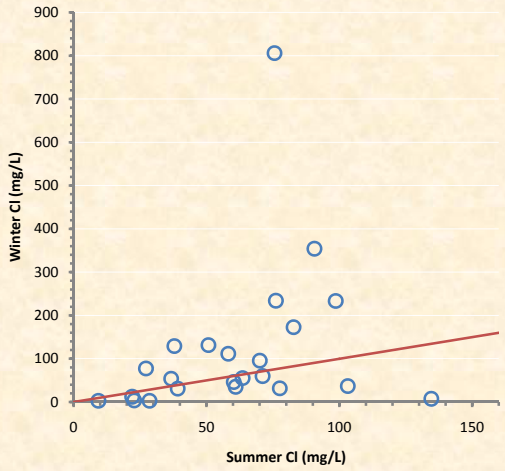
Effects in the stream



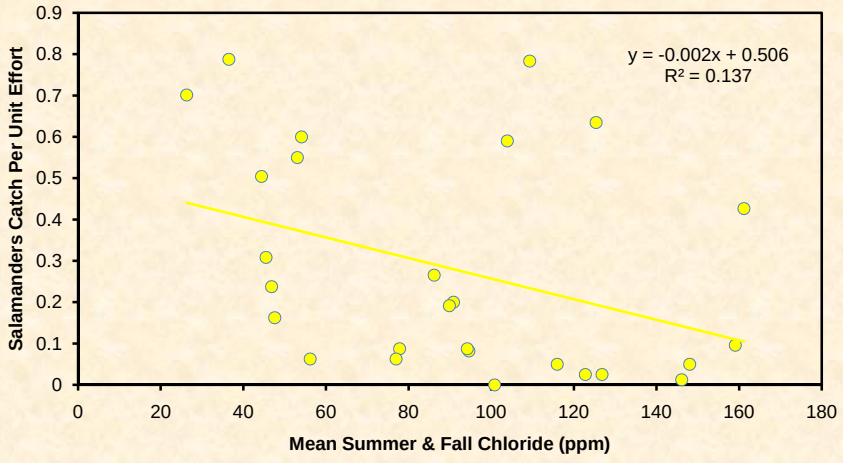


Stream study sites

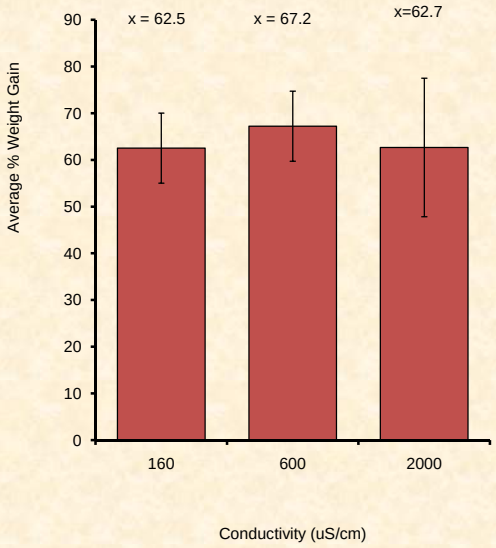
Seasonal changes in Chloride levels



Results of field surveys



Laboratory bioassays



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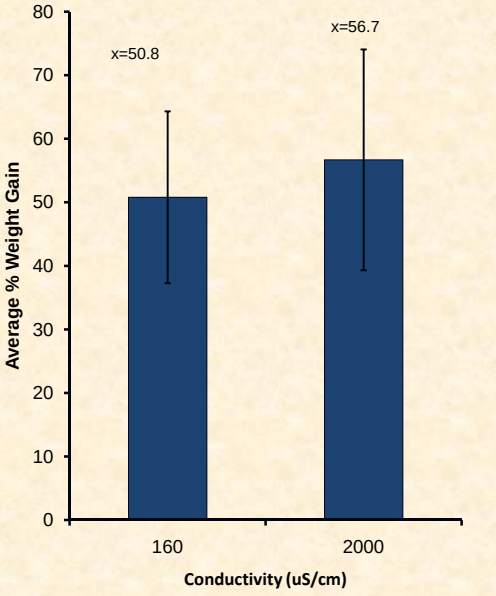

Conclusion

- Road deicers are reaching streams and altering water chemistry, despite modern storm water management
- Road deicers are interacting with other pollutants
- Road deicers are having toxic effects